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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/849,530 | 05/07/2001 | Vincent J. McGahay | E19-98-172US2 | 1010 |

7590 12/05/2001

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| EXAMINER |
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COLLINS, DEVEN M

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| ART UNIT | PAPER NUMBER |
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2823

DATE MAILED: 12/05/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/849,530

Applicant(s)

MCGAHAY ET AL.

Examiner

D. M. Collins

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 30 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 15-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 2823

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 15-31 are rejected under 35 U.S.C. 102(b) as being unpatentable over Liu et al. (6,046,108, dated 4/4/00).

Liu et al. show the method as claimed in Figure 1 with corresponding text. In re claim 15, Liu et al. discloses a process for fabricating a semiconductor structure 10 which comprises the steps of providing a germanium-containing layer of at least one member selected from the group consisting of copper germanide (Cu₃Ge) 24, germanium oxide, germanium nitride and combinations thereof onto at least one surface of a copper member 22; and providing a layer of a material that does not adhere well to copper 12 on the germanium-containing layer.

In re claim 16, Liu et al. discloses which comprises providing a germanium-containing layer by selectively forming copper germanide 24 on the copper member 22 by flowing germane over the structure 10.

Art Unit: 2823

In re claim 17, Liu et al. discloses wherein the germane (GeH_4) is at a temperature of about 200 to about 450 degrees Celsius. (col. 5, line 37)

In re claim 18, Liu et al. discloses which comprises providing a gaseous composition containing about 0.05 to about 5 % of germane and a second gas selected from the group consisting of nitrogen, helium, argon, and mixtures thereof. (col. 5, par. 6)

In re claim 19, Liu et al. discloses wherein the germanium-containing layer is provided by providing a layer of copper germanide 24 on the copper 22 and then oxidizing all or a portion of the copper germanide 24 to provide a layer of germanium oxide.

In re claim 20, Liu et al. discloses wherein the thickness of the germanium-containing layer is about 100 to about 1000 angstroms. (col. 4, line 49)

In re claim 21, Liu et al. discloses wherein the thickness of the germanium-containing layer is about 150 to about 400 angstroms. (col. 4, line 49)

In re claim 22, Liu et al. discloses wherein the layer of copper germanide is about 100 to about 1000 angstrom and the layer of germanium oxide is about 100 to about 1000 angstroms. (col. 4, line 49)

In re claim 23, Liu et al. discloses wherein the germanium-containing layer comprises providing a layer of copper germanide 24 and then nitriding all or portion of the copper germanide layer 24 to provide germanium nitride. (col. 3, par. 5)

Art Unit: 2823

In re claim 24, Liu et al. discloses wherein the copper germanide 24 layer is about 100 to about 1000 angstroms thick and the germanium nitride layer is about 100 to about 1000 angstroms thick.

In re claim 25, Liu et al. discloses wherein the germanium-containing layer is provided by providing a layer of copper germanide 24 on the copper 12, then oxidizing all or a portion of the copper germanide 24 to provide a layer of germanium oxide, and then nitriding a portion of the copper oxide layer to provide germanium nitride.

In re claim 26, Liu et al. discloses wherein the copper member 22 is copper 12 or a copper alloy.

In re claim 27, Liu et al. discloses wherein the copper member 22 is about 1000 to about 20,000 angstrom thick.

In re claim 28, Liu et al. discloses wherein the layer of silicon nitride is about 100 to about 20,000 angstrom thick.

In re claim 29, Liu et al. discloses wherein the material that does not adhere well to copper 12 is silicon nitride. (col. 5, line 64)

In re claim 30, Liu et al. discloses wherein the material that does not adhere well to copper 12 is silicon dioxide. (col.5. line 64)

Art Unit: 2823

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Deven M. Collins whose telephone number is (703) 305-7840.

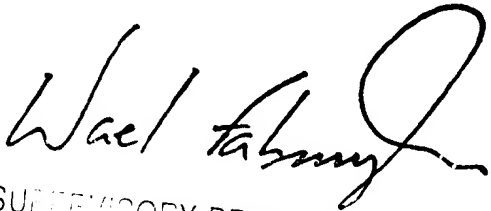
The examiner can normally be reached on Monday-Friday from 6:30 AM to 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy, can be reached on (703) 308-4918. The fax phone number for this Group is (703) 305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

DMC

November 19, 2001


SUPERVISORY PRIMARY EXAMINER
TEL. (703) 308-4918